

# Work Order ID 81791

March-19-12 1:27:08 PM

*MAY*  
\*81791\*

Page 1

Item ID: D206-667-107BL

Accept

\*N900040100\*

Setup Start

\*NS1\*

Revision ID:

Stop

\*NS2\*

Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

\*1\*

Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

\*1\*

Customer:

Reference:

Approvals: Process Plan: *MLJ*

Date: *12/03/19*

Tooling:

Date:

Run Start

\*NR1\*

QC:

Date:

SPC (Y/N):

Date:

Stop

\*NR2\*

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

Draw Nbr Revision Nbr

D206-667-147 A (DEO)

DSI9565 A

IIN-D206-667 D

100

\*100\*

DC

Document Control

DOCUMENT CONTROL

Memo

Photocopy bluefile and create labels as per PPP D206-667-107 chg 002

0.00

0.00

110

\*110\*

Packaging

Packaging

Pick Kit

Packaging

Memo

0.00

0.00

*Sizely*

*for CL 12-4-11*

*MO/21*

*12/3/21*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

**\*81791\***

Page 2

**Accept**

**\*N900040100\***

Setup Start \*NS1\*

Stop \*NS2\*

**Start Date:** 19/03/2012    **Start Qty:** 1.00    **\*1\***

**Cust Item ID:**

**Required Date:** 18/05/2012      **Req'd Qty:** 1.00      **\* 1 \***

**Customer:**

**Reference:**

**Approvals:**      **Process Plan:** \_\_\_\_\_      **Date:** \_\_\_\_\_      **Tooling:** \_\_\_\_\_      **Date:** \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop \*NR2\*

120

**\*120\***

CNC Bend 2

## CNC Alpha 160 Bender

### Operation Description

BENDING MACHINE - CROSSTUBES

## Memo

Bend tube as per Dwg D206-667-147 using CNC bender program

## Set Up/ Run Hours

0.00

0.00

Tool ID	Tool #	Plan Code
---------	--------	-----------

Accept  
Qty

Reject  
QtyReject  
Number

**Insp.  
Stamp**

130

**\*130\***

QC

## Quality Control

QC15- Crosstube Dimensional Check

## Memo

0.00

0.00

① B 12.03.22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 81791**

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Item ID: D206-667-107BL

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

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Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

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Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals: Process Plan: Date: Tooling: Date:

Run Start **\*NR1\***

QC: Date: SPC (Y/N): Date:

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
--------------------------------	--------------------------	----------------------	---------	--------	--------------	---------------	---------------	------------------	----------------

140

0.00

**\*140\***

Crosstubes

Crosstubes

Memo

0.00

1-Drill holes &amp; ream using drill Jig DT8541 &amp; DT8542 as per Dwg D206-667-147. Drill all (3) top holes.

3-Flip tube and switch drilling Jigs from right to left, left to right. Locate Jigs off existing holes using "T" pins.

4-Drill pilot holes using drill Jig DT8541 &amp; DT8542 as per Dwg D206-667-147. Drill only the top (2) holes.

5-Drill pilot holes as per Dwg D206-667-147. Drill only the top (2) holes.

6-Drill Fwd rivet holes using drill Jig DT8787 fwd as per Dwg D206-667-147. Note: Fwd side has 3x top holes.

7-Drill Aft rivet holes using drill Jig DT8787 fwd as per Dwg D206-667-147.

8-C'sink holes as per Dwg D206-667-147. Allow rivet to sit below surface to compensate for paint.

9 -Scribe part # and batch # using vibrating stylus as per Dwg D206-667-147 Inside of Cuff (Donot engrave on outside of tube)

10-Deburr &amp; Inspect for surface damage. Repair damage within limits as per Dwg D206-667-147

TW

12-3-22

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 81791****\*81791\***

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Item ID: D206-667-107BL

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

150

Crosstubes Chemical Conversion

0.00

**\*150\***

HandFXtube

Memo

0.00

Hand Finishing Crosstubes

TW

12-3-22

160

QC3- Inspect Part Finish

0.00

**\*160\***

QC

Memo

0.00

Quality Control

QC3

DP

12-3-23

PTQ

170

QC5- Inspect part completeness to step on W/O

0.00

**\*170\***

QC

Memo


0.00

Quality Control

DP

12-3-23

**Dart Aerospace Ltd**

W/O: 81791		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector
12-3-23	160	Should read QC7		12-3-23			

Part No: D206-667-107BL PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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**Accept**

Setup Start \*NS1\*

Stop \*NS2\*

**Start Date:** 19/03/2012    **Start Qty:** 1.00    **\*1\***

**Cust Item ID:**

**Required Date:** 18/05/2012      **Req'd Qty:** 1.00      **\* 1 \***

**Customer:**

**Reference:**

**Approvals:** \_\_\_\_\_ **Process Plan:** \_\_\_\_\_ **Date:** \_\_\_\_\_ **Tooling:** \_\_\_\_\_ **Date:** \_\_\_\_\_

Run Start \*NR1\*

QC: \_\_\_\_\_ Date: \_\_\_\_\_ SPC (Y/N): \_\_\_\_\_ Date: \_\_\_\_\_

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
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180	Outsource process - NDT per QSI038 4.1	0.00
-----	--	------

**\*180\***

Outsource2	Memo	0.00
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### Outsource process - NDT

## Memo

CROSSTUBES

P/O: 16555

190	0.00
-----	------

\*190\*

## Packaging

Packaging	Memo	0.00
-----------	------	------

## Packaging

Ensure copy of NDT results attached to work order.

200	QC5- Inspect part completeness to step on W/O	0.00
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**\*200\***

QC

## Memo

## Quality Control

S. 263/26

76

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 81791****\*81791\***

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Item ID: D206-667-107BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

210

0.00

**\*210\***

SprayPaint

SprayPaint

Memo

0.00

Spray Painting

1-Prime inside and outside crosstube as per QSI 005 4.2

2-Paint outside crosstube with ~~White Iron~~ <sup>Blue</sup> as per QSI 005 4.2

PRIME:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

Prime 117319

PAINT:

Start Time: \_\_\_\_\_

Finish Time: \_\_\_\_\_

Paint 118395

Clear 118093

AB 12 - 4 - 3

220

QC14- Inspect Spray Paint

0.00

**\*220\***

QC

Memo

0.00

Quality Control

Wrap in plastic bag to protect from scratches

① 12 04 04

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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**NOTE:** Date & initial all entries

**Work Order ID 81791****\*81791\***

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Item ID: D206-667-107BL

Accept

**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/ Work Center ID	Operation Description	Set Up/ Run Hours	Tool ID	Tool #	Plan Code	Accept Qty	Reject Qty	Reject Number	Insp. Stamp
230	Crosstubes	0.00							
<b>*230*</b>									
Crosstubes	<b>Memo</b>	0.00							
Crosstubes	1-Abrade mating surfaces of support and crosstube with 400 grit sandpaper, clean the area with 4105S wash 'n' wipe								
	2-Install supports with Proseal 890 per DS19565 and QSI 015 A/R Proseal 890 Batch: <u>120867</u>								
	3- Torque bolts as per dwg								
	4-Install nut plates as per Dwg D206-667-147. Touch-up rivet heads with Imron paint.								
240	QC5- Inspect part completeness to step on W/O	0.00							
<b>*240*</b>									
QC	<b>Memo</b>	0.00							
Quality Control									

①

12-04-11

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

# Work Order ID 81791

**\*81791\***

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March-19-12 1:27:08 PM

Item ID: D206-667-107BL

Accept

**\*N900040100\***

Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***

Sequence ID/  
Work Center ID

Operation  
Description

Set Up/  
Run Hours

Tool ID

Tool #

Plan  
Code

Accept  
Qty

Reject  
Qty

Reject  
Number

Insp.  
Stamp

250

Pick Kit

0.00

**\*250\***

Packaging

Memo

0.00

Packaging

260

QC4- 100% Inspect kits for completeness

0.00

**\*260\***

QC

Memo

0.00

Quality Control

270

Packaging

0.00

**\*270\***

Packaging

Memo

0.00

Packaging

Identify and pack for shipping as per PPP D206-667-107

Location:

PPP Rev: P

*Handwritten signatures and initials*

*Handwritten signature*

*Handwritten circled number 12*

*Handwritten signature*

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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**Work Order ID 81791****\*81791\***

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March-19-12 1:27:08 PM

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**\*N900040100\***Setup Start **\*NS1\***

Revision ID:

Stop **\*NS2\***

Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012 Start Qty: 1.00

**\*1\***

Cust Item ID:

Required Date: 18/05/2012 Req'd Qty: 1.00

**\*1\***

Customer:

Reference:

Approvals:

Process Plan:

Date:

Tooling:

Date:

Run Start **\*NR1\***

QC:

Date:

SPC (Y/N):

Date:

Stop **\*NR2\***Sequence ID/  
Work Center IDOperation  
DescriptionSet Up/  
Run Hours

Tool ID

Tool #

Plan  
CodeAccept  
QtyReject  
QtyReject  
NumberInsp.  
Stamp

280

QC21- Final Inspection - Work Order Release

0.00

**\*280\***

QC

Memo

0.00

Quality Control

12/4/12  
12-04-12

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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# Picklist Print

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Page 1

Work Order ID: 81791

\*81791\*

Parent Item: D206-667-107BL

\*D206-667-107BI \*

Parent Item Name: Crosstube Mid Fwd, Blue

Start Date: 19/03/2012

Required Date: 18/05/2012

Start Qty: 1.00

Required Qty: 1.00

Comments: revA 11.01.13 New Issue EC verified by:DD  
11.08.08 PER ECN 11-615 DD VERF:EC

IPP REV:B

Component Item ID/ Item Name	Replacement Item ID	Mfg/ Purch	Bin Item	Primary Location	Last Location	Route Seq ID	Unit of Measure	Qty on Hand	Qty per Kit	Total Qty	Qty Issued	Date Issued	Status
D206-667-147TRN		Manufactured	No			110	Each	2.0000	1	1			

\*D206-667-147TRN\*

\*\*

Crosstube Assembly, Mid Fwd

Location Loc Qty Loc Code

LG -1

LG003 3

79663 1

79664 1

D2873-043 Manufactured No

230 Each 24.0000 2 2

\*D2873-043\*

\*\*

Nut Plate Assembly

Location Loc Qty Loc Code

LG 2

79395 2

LG052 22

72644 2

80228 20

D2873-045 Manufactured No

230 Each 17.0000 2 2

\*D2873-045\*

\*\*

Nut Plate Assembly

Location Loc Qty Loc Code

LG052 17

80162 17

4

MO/AM 12/3/21

AS 12-4-11

AS 12-4-11

81502

81425

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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Work Order ID: 81791

Parent Item: D206-667-107BL

Parent Item Name: Crosstube Mid Fwd, Blue

\*81791\*

\*D206-667-107RI \*

Start Date: 19/03/2012

Required Date: 18/05/2012

Start Qty: 1.00

Required Qty: 1.00

D2891-1 Manufactured No

230 Each 4.0000 2 2

\*D2891-1\*

2.25 Support

\*\*

AS 12-4-8

Location

Loc Qty

Loc Code

LG052

4

72822

1

75176

3

D3595-063-395 Manufactured No

230 Each 2.0000 4 4

\*D3595-063-395\*

RUBBER CUSHION

\*\*

AS 12-4-8

Location

Loc Qty

Loc Code

MAT052

2

74300

2

cut (4)0.063" X 3.95"

MS20601-AD4W8

Purchased No

230 Each 190.0000 14 14

\*MS20601-AD4W8\*

RIVET

\*\*

AS 12-4-11

Location

Loc Qty

Loc Code

LG051

190

121017

190

MS21920-20

Purchased No

230 Each 110.0000 4 4

\*MS21920-20\*

Clamp (per MIL-DTL-8783C)

\*\*

AS 12-4-8

Location

Loc Qty

Loc Code

LG050

110

116799

8

120475

2

120676

50

121067

50

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
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March-19-12 1:27:12 PM

Work Order ID: 81791

Parent Item: D206-667-107BL

Parent Item Name: Crosstube Mid Fwd, Blue

\*81791\*

\*D206-667-107BI \*

Start Date: 19/03/2012

Required Date: 18/05/2012

Start Qty: 1.00

Required Qty: 1.00

AN5-30A Purchased No

250 Each

103.0000 4 4

\*\*

\*AN5-30A\*  
BOLT

## Location

## Loc Qty

## Loc Code

ST339

103

117514

7

120423

71

120910

25

120423

AN5-32A Purchased No

250 Each

256.0000 4 4

\*\*

\*AN5-32A\*  
Bolt

## Location

## Loc Qty

## Loc Code

ST339

256

119328

100

119862

50

120423

75

120717

1

120910

30

119328

AN5-7A Purchased No

250 Each

2,693.000 10 10

\*\*

\*AN5-7A\*  
Bolt

## Location

## Loc Qty

## Loc Code

ST337

2693

119017

2693

119017

AN960JD516 NAS1149D0563J Purchased No

250 Each

0.0000 18 18

\*\*

\*AN960JD516\*  
Washer

1118614

# Dart Aerospace Ltd

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



# Picklist Print

March-19-12 1:27:12 PM

Work Order ID: 81791

Parent Item: D206-667-107BL

Parent Item Name: Crosstube Mid Fwd, Blue

\*81791\*

\*D206-667-107BL \*

Start Date: 19/03/2012

Required Date: 18/05/2012

Start Qty: 1.00

Required Qty: 1.00

AN970-4

Purchased

No

250


Each


81.0000

12

12

\*\*

3/2/2012 

 \*AN970-4\*  
Washer

Location

Loc Qty

Loc Code

ST344

81

115936

11

116900

1

120308

39

120644

30

MS21042L5

Purchased

No

250

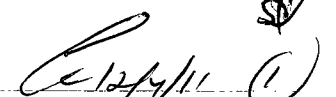
Each


1,598.000

4

4 ✓

\*\*

 3/24/11 (1)

 \*MS21042L 5\*  
Nut

Location

Loc Qty

Loc Code

ST300

1598

116105

5

116548

43

117611

42

118179

8

119109

1500

119109

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

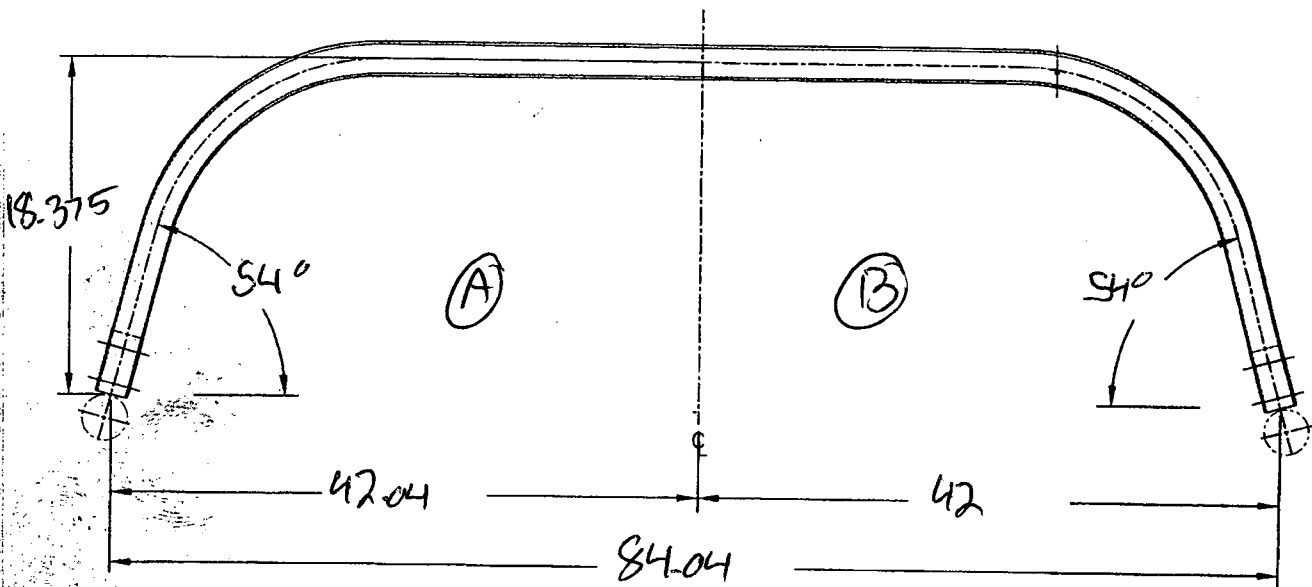
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

DART AEROSPACE LTD		Work Order:	81791
Description: Crosstube Mid Fwd (206L)		Part Number:	D206-667-107
Inspection Dwg: D206-667-147 Rev: A		Page 1 of 1	

Required Dimension	Min	Max
Height	18.34	18.60
1/2 Span	41.79	42.05
Angle	54°	56°
Total Span	83.59	84.09
Bending Passes	10	N/A
Crushing	N/A	6%



Crushing (A) 5.2%	Comments
(B) 5%	

QC15 Inspection	B 12-03-22
Date	

Rev	Date	Change	Revised by	Approved
A	12.02.15	New Issue	KJ	41

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

NOTE: Date & initial all entries

Item	Qty -147	Part Number	Description
1	X	D206-667-147	CROSSTUBE ASSEMBLY (206L MID FWD)
2	1	D6002-115	CROSSTUBE
3	2	D2873-043	NUT PLATE
4	2	D2873-045	NUT PLATE
5	2	D2891-1	SUPPORT
6	4	D3595-063-395	RUBBER CUSHION
7	4	MS21920-20	CLAMP (OR MS21920-21)
8	14	MS20601AD4W8	RIVET (OR NAS9302B-4-8)
9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299- 947-100, TYPE II, CLASS 2 ADHESIVE)

**GENERAL NOTES:**

- 1) MATERIAL: MANUFACTURED FROM D6002-115  
FINISHED LENGTH = 99.84±0.020
- 2) FINISH: CHEMICAL CONVERSION COAT PER DART QSI 005 4.1  
PRIME INSIDE AND OUTSIDE PER DART QSI 005 4.2  
PAINT OUTSIDE PER DART QSI 005 4.2
- 3) TOLERANCES ARE PER DART QSI 018 UNLESS OTHERWISE NOTED.
- 4) UNITS: INCHES UNLESS OTHERWISE NOTED.
- 5) BREAK SHARP EDGES: 0.005 TO 0.010 MAX.
- 6) IDENTIFICATION: SCRIBE DART PART NUMBER "D206-667-147" AND BATCH NUMBER ON  
INSIDE OF CUFF PER DART QSI 044 6.4 (VIBRATING STYLUS).
- 7) WEIGHT: 15.0 lbs (-507 = 12.84)
- 8) PART IS SYMMETRIC ABOUT CENTERLINE.
- 9) RUN CUTTER OFF PART WHERE INDICATED. BLEND OUT EDGE LONGITUDINALLY,  
TRANSITION SHOULD BE SMOOTH.
- 10) BEND PROGRESSIVELY WITH A MINIMUM OF 10 PASSES. MAXIMUM TUBE FLATTENING DUE  
TO BENDING IS 6% BASED ON O.D.
- 11) LIQUID PENETRANT INSPECT OUTSIDE SURFACE OF CROSSTUBE PER QSI 038.
- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI  
015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 13) INSTALL MS21920-20 CLAMPS (OR -21) WITH D3595-063-395 RUBBER CUSHIONS TO SECURE  
THE D2891-1 SUPPORT ON TOP SIDE OF THE CROSSTUBE. ENSURE CLAMP MECHANISMS  
ARE LOCATED ON CROSSTUBE SUPPORTS.
- 14) EXTREME CARE MUST BE TAKEN TO PROTECT THE OUTSIDE SURFACE OF THE TUBE. THE  
OUTSIDE SURFACE MUST BE SMOOTH AND FREE FROM SURFACE DEFECTS SUCH AS  
SCRATCHES, NICKS, OR DENTS. DEFECTS UP TO 0.005" MAY BE BLENDED OUT  
LONGITUDINALLY. CIRCUMFERENTIAL GRIND MARKS ARE UNACCEPTABLE.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS ARE SHOWING IN  
SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

SHOP COPY  
RETURN TO  
ENGINEERING  
UNCONTROLLED COPY  
SUBJECT TO AMENDMENT  
WITHOUT NOTICE  
WORK ORDER

NO. 81791 MLJ  
12/03/19

DEO ATTACHED

EOW HK-615  
11.07.28

UNDER REVIEW  
11/08/19

RELEASED  
2011-05-23  
JNP

A	NEW ISSUE	CP	10.11.23
REV.	DESCRIPTION	BY	DATE
DESIGN			
DRAWN			
CHECKED			
MFG. APPR.			
APPROVED			
DE APPR.			
DATE	10.12.23		

<b>DART AEROSPACE LTD</b> HAWKESBURY, ONTARIO, CANADA	
DRAWING NO. D206-667-147	REV. A SHEET 1 OF 4
TITLE CROSSTUBE ASS'Y (206L MID FWD)	SCALE NTS
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W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

8 7 6 5 4 3 2 1

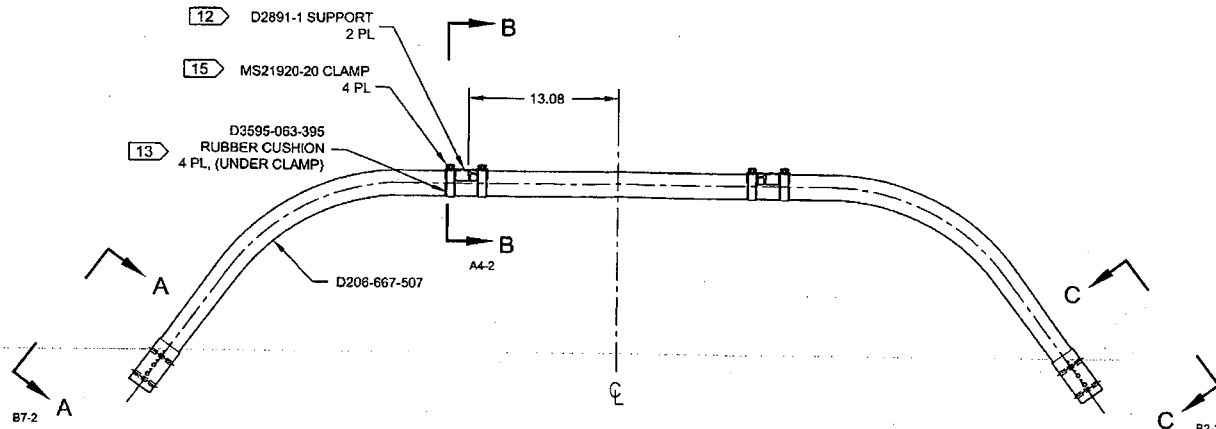
81791

ECW #R.615  
11.07.26

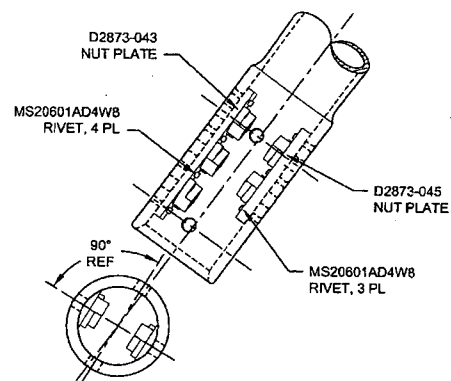
UNDER REVIEW

RELEASED  
2011-05-24

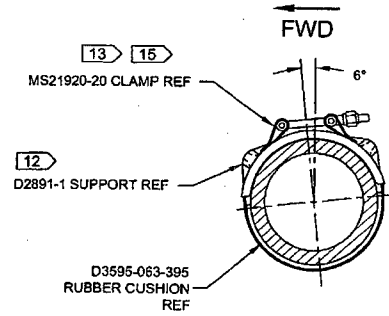
DEO ATTACHED



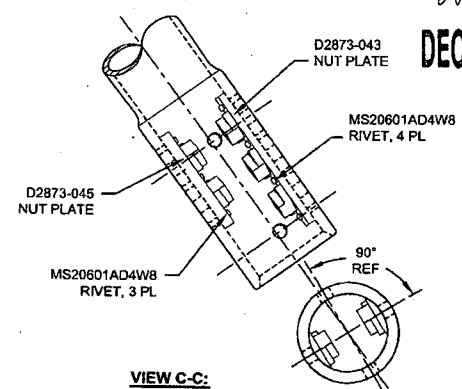
**D206-667-147**  
**ASSEMBLY DETAIL**  
(VIEW LOOKING FWD)



**VIEW A-A:**  
**CUFF DETAIL**  
SCALE 4X



**SECTION B-B**  
SCALE 5X



**VIEW C-C:**  
**CUFF DETAIL**  
SCALE 4X

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO.	REV. A
MFG. APPR.		D206-667-147	SHEET 2 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASSY (206L MID FWD)	NTS
DATE	10.12.23	<small>COPYRIGHT © 2010 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD</small>	

8 7 6 5 4 3 2 1

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

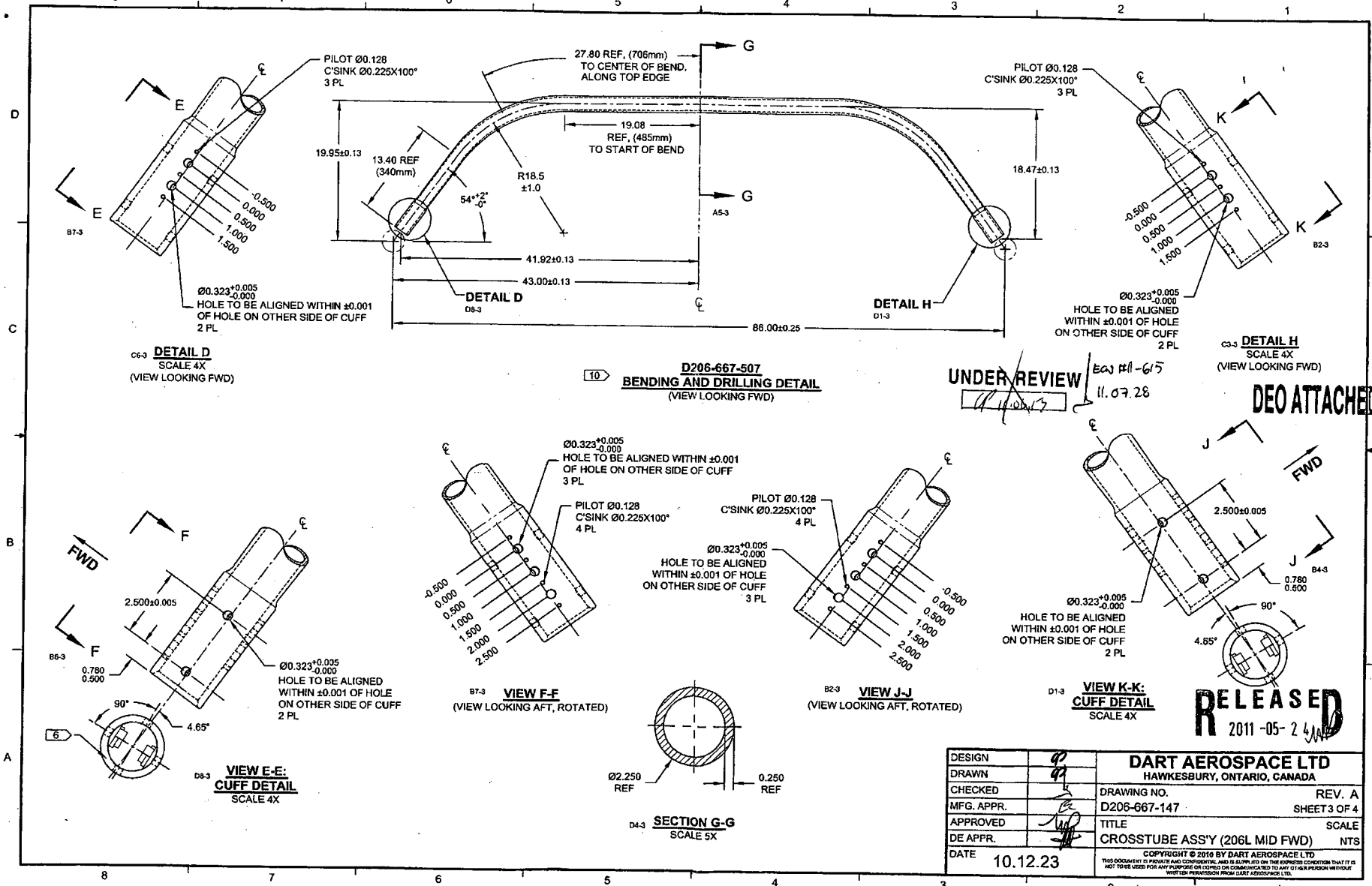
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NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



81791



DEO ATTACHED

RELEASED  
2011-05-24

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

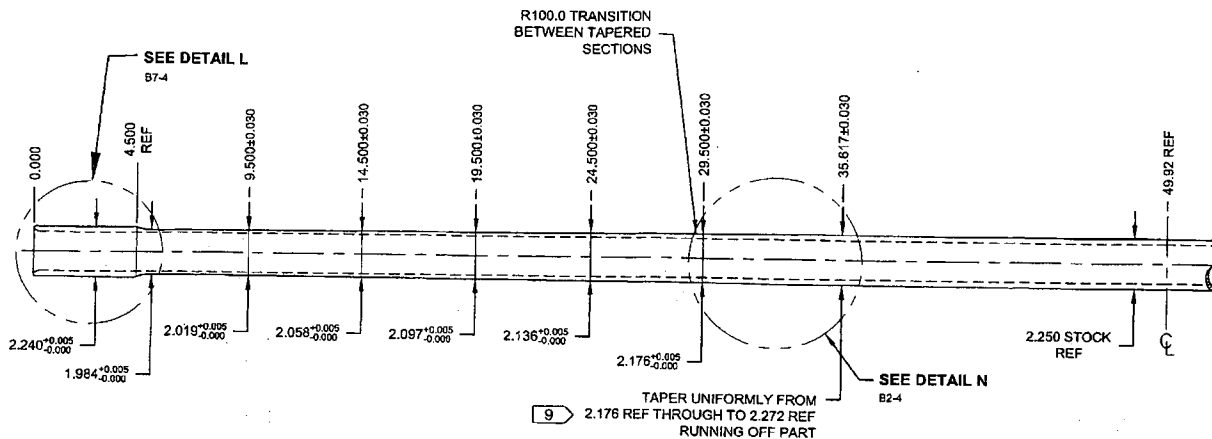
NCR:		WORK ORDER NON-CONFORMANCE (NCR)						
DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

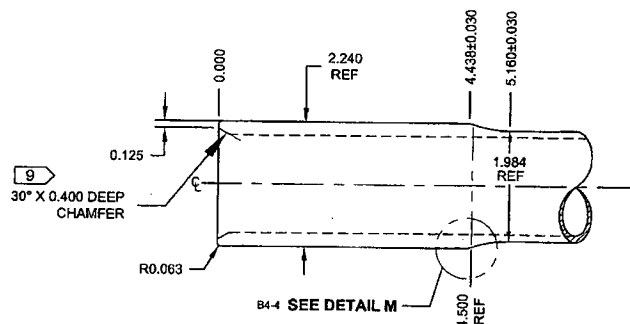
81791

UNDER REVIEW

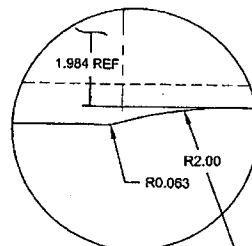
11.06.13  
ECN # 11-615  
11.07.20



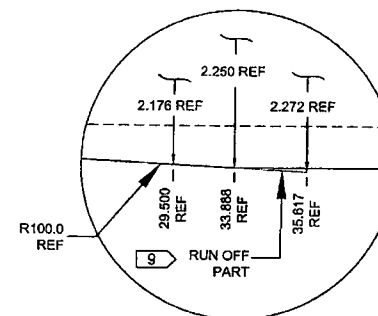
**TURNING DETAIL**



**DETAIL L:  
CROSSTUBE CUFF**  
NOT TO SCALE



**DETAIL M:  
CUFF TRANSITION**  
NOT TO SCALE



**DETAIL N:  
TAPER RUN-OFF**  
NOT TO SCALE

**RELEASED**  
2011-05-23

DESIGN		<b>DART AEROSPACE LTD</b>	
DRAWN		HAWKESBURY, ONTARIO, CANADA	
CHECKED		DRAWING NO. D206-667-147	REV. A
MFG. APPR.			SHEET 4 OF 4
APPROVED		TITLE	SCALE
DE APPR.		CROSSTUBE ASS'Y (206L MID FWD)	NTS
DATE	10.12.23	COPYRIGHT © 2010 BY DART AEROSPACE LTD THIS DOCUMENT IS PRIVATE AND CONFIDENTIAL, AND IS SUPPLIED ON THE EXPRESS CONDITION THAT IT IS NOT TO BE USED FOR ANY PURPOSE OR COPIED OR COMMUNICATED TO ANY OTHER PERSON WITHOUT WRITTEN PERMISSION FROM DART AEROSPACE LTD.	

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

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DATE	STEP	Description of NC Section A	Corrective Action Section B			Verification Section C	Approval Chief Eng	Approval QC Inspector
			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries

81791

DRAWING NO. D206-667-147	TITLE CROSSTUBE ASS'Y (206L MID FWD)	REV. A	DART AEROSPACE LTD ENGINEERING ORDER		D.E.O. NO. D206-667-147-A-1	SHEET NO. SHEET 1 OF 1	SCALE NTS
DRAWN 97	CHECKED AJS	MFG. APPR. [Signature]	APPROVED [Signature]		DE APPR. [Signature]		
DATE 11.07.15	DATE 11.07.20	DATE 11.07.21	DATE 11/07/21		DATE 11.07.21		

**PURPOSE:**

REPLACE MAGNOBOND WITH PROSEAL.

**CHANGE:**

IS:

Item	Qty -147	Part Number	Description
9	A/R	PROSEAL 890 B-2	SEALANT, AMS-S-8802 CLASS B-2

WAS:

9	A/R	MAGNOBOND 6398	ROCKWELL SPECIFICATION RBO-120-023 ADHESIVE (TEXTRON/BELL SPEC. 299-947-100, TYPE II, CLASS 2 ADHESIVE)
---	-----	----------------	---

NOTE 12 & 15, SHEET 1 IS AMENDED AS FOLLOWS:

IS:

- 12) TO INSTALL D2891-1 SUPPORT: ABRABE MATING SURFACE OF SUPPORT AND CROSSTUBE WITH 180-GRIT SANDPAPER AND REMOVE RESIDUE WITH MEK (OR EQUIVALENT). APPLY A 0.04" TO 0.07" THICK LAYER OF PROSEAL 890 CLASS B-2 (OR AMS-S-8802 CLASS B-2) SEALANT TO MATING SURFACE OF SUPPORT.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING. **PRIOR TO PACKAGING, RE-CHECK TORQUE ON CLAMPS AFTER PROSEAL 890 SEALANT HAS CURED FOR 72 HOURS.**

WAS:

- 12) INSTALL D2891-1 SUPPORT USING 0.03" TO 0.06" THICK LAYER OF MAGNOBOND 6398 PER QSI 015. LET CURE FOR 12 HOURS AFTER INSTALLATION AND PRIOR TO PACKAGING.
- 15) TORQUE CLAMPS 80 TO 100 IN-LB. ENSURE AT LEAST 1.5 THREADS SHOWING IN SAFETY AND THAT NUT HAS NOT BOTTOMED-OUT AFTER TORQUING.

RELEASED  
2011-07-28  
[Signature]

W/O:		WORK ORDER CHANGES					
DATE	STEP	PROCEDURE CHANGE	By	Date	Qty	Approval Chief Eng / Prod Mgr	Approval QC Inspector

Part No: \_\_\_\_\_ PAR #: \_\_\_\_\_ Fault Category: \_\_\_\_\_ NCR: Yes No DQA: \_\_\_\_\_ Date: \_\_\_\_\_

Resolution: \_\_\_\_\_ Disposition: \_\_\_\_\_ QA: N/C Closed: \_\_\_\_\_ Date: \_\_\_\_\_

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			Initial Chief Eng	Action Description Chief Eng	Sign & Date			

**NOTE:** Date & initial all entries



## LIQUID PENETRANT TEST REPORT

P- 12178

CLIENT	DART Aerospace	DATE	03/23/2012	PAGE	1	OF	1	
ATTENTION	LINDA LACELLE	ACUREN JOB NO.	180-12-C0072	TIME	AM	<input checked="" type="checkbox"/>	PM	<input type="checkbox"/>
ADDRESS	1770 ABERDEEN ST. HAWKES BURY ON.	PO/VO No.	-	WORK LOCATION	SAME			
PROJECT	F.P.I. on CROSS TUBES	ACCEPTANCE STD.	ASTM 1417/01-03	REV./DATE	2005			
ITEM(S) EXAMINED	(9)							

JOB DESCRIPTION	PROCEDURE NO.	LT-02	REV./DATE	2008	TECHNIQUE NO.	LT-02#2	REV./DATE	2008
PART NO.	SEE RESULTS				MATERIAL	ALUMINUM THICKNESS VARIATIONS		
SCOPE	A WET FLUORESCENT LIQUID PENETRANT INSPECTION WAS CARRIED OUT ON 100% EXTERNAL SURFACE							

TEST DETAILS	
METHOD	<input checked="" type="checkbox"/> FLUORESCENT <input type="checkbox"/> VISIBLE
FAMILY BRAND	NASNAFLUX
PENETRANT	2LG2 MINIMUM DWELL TIME 45X MIN.
PENETRANT REMOVER	H2O MINIMUM DRY TIME >10 MIN.
DEVELOPER	SK052 MINIMUM DWELL TIME 10 MIN.
DEVELOPER TYPE	<input checked="" type="checkbox"/> NON AQUEOUS <input type="checkbox"/> AQUEOUS <input type="checkbox"/> DRY
<input checked="" type="checkbox"/> WATER WASH <input type="checkbox"/> SOLVENT REMOVABLE <input type="checkbox"/> POST EMULSIFIED	
BLACK LIGHT S/N 16459 <input type="checkbox"/> OUTPUT > 1000 $\mu$ W/cm <sup>2</sup> <input type="checkbox"/> AMBIENT < 2 fc	
LIGHTING EQUIP. <input type="checkbox"/> FLASHLIGHT <input type="checkbox"/> TROUBLELIGHT <input type="checkbox"/> OUTPUT > 100 fc @ SURFACE	
OTHER	
LIGHT METER S/N 1098866 CAL DUE DATE July 08	
2012	

TEST SURFACE	
SURFACE CONDITION	<input type="checkbox"/> AS GROUND <input checked="" type="checkbox"/> AS WELDED <input type="checkbox"/> MACHINED <input type="checkbox"/> SHOT BLASTED <input type="checkbox"/> CLEAN BARE METAL
SURFACE TEMPERATURE	<input type="checkbox"/> < -4°C/ 20°F <input type="checkbox"/> -4°C/ 20°F TO 10°C/ 50°F <input checked="" type="checkbox"/> 10°C/ 50°F TO 52°C/ 125°F <input type="checkbox"/> > 52°C/ 125°F

RESULTS- ( <input checked="" type="checkbox"/> METRIC <input type="checkbox"/> IMPERIAL)	
CROSS TUBES	
1	W.O. # 78700 ✓
1	" " 78699 ✓
1	" " 81481 ✓
1	" " 81480 ✓
1	" " 81790 ✓
1	" " 79790 ✓
1	" " 79842 ✓
1	" " 81791 ✓
A REGRIND AREA ( )	
S. 12/1/76	

## Scope of Services

The agreement of Acuren Group Inc. to perform services extends only to those services provided for in writing. Under no circumstances shall such services extend beyond the performance of the requested services. It is expressly understood that all descriptions, comments and expressions of opinion reflect the opinions of Acuren Group Inc. based on information and assumptions supplied by the owner/operator and are not intended nor can they be construed as representations or warranties. Acuren Group Inc. is not assuming any responsibilities of the owner/operator and the owner/operator retains complete responsibility for the engineering, manufacture, repair and use decisions as a result of the data or other information provided by Acuren Group Inc. In no event shall Acuren Group Inc.'s liability in respect of the services referred to herein exceed the amount paid for such services.

## Standard of Care

In performing the services provided, Acuren Group Inc. uses the degree, care and skill ordinarily exercised under similar circumstances by others performing such services in the same or similar locality. No other warranty, expressed or implied, is made or intended by Acuren Group Inc.

## SIGNATURES

CLIENT REPRESENTATIVE	Andrew Sheldon	Signature	DTR #	563476
TECHNICIAN (SIGNATURE):	Mike J. Harston	Signature	REPORT REVIEWED BY:	
NAME (PRINT):	Mike J. Harston	NAME	INITIALS	
CGSB LEVEL	1 <sup>ST</sup> TECHNICIAN	CGSB LEVEL	2 <sup>ND</sup> TECHNICIAN	
CGSB REG. NO.	6606	CGSB REG. NO.		

# REFERENCE ONLY

DART AEROSPACE LTD.

IIN-D206-667

Page 18 of 19

## 5.2 MID-HEIGHT CROSSTUBES

Item	Qty -107	Qty -207	Part Number	Description
	X		D206-667-107	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 MID FWD
		X	D206-667-207	CROSSTUBE INSTALLATION, 206L/L-1/L-3/L-4 MID AFT
7	1		D206-667-147	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 MID FWD
8		1	D206-667-247	CROSSTUBE ASSEMBLY, 206L/L-1/L-3/L-4 MID AFT
10	*2		D2891-1	SUPPORT
11		*2	D2892-1	SUPPORT
13	*4		D3595-063-395	RUBBER CUSHION
14		*4	D3595-063-450	RUBBER CUSHION
16	*4		MS21920-20	CLAMP
17		*4	MS21920-22	CLAMP
19	/4		AN5-32A	BOLT
20		4	AN5-34A	BOLT
21	/4	4	MS21042L5	NUT (OR MS21042-5)
22	/8	8	NAS1149C0563J	WASHER (OR AN950JD516)
40	*2	*2	D2873-043	NUT PLATE
41	*2	*2	D2873-045	NUT PLATE
44	/10		AN5-7A	BOLT
45		10	AN5-10A	BOLT
46	/4		AN5-30A	BOLT
47		4	AN5-32A	BOLT
48	/12		AN970-4	WASHER (OPTIONAL)
50	10	10	NAS1149C0563J	WASHER (OR AN960JD516)

\*REFERENCE ONLY. PARTS ARE INCLUDED IN D206-667-147/-247 ASSEMBLIES ABOVE

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Revision: D  
Date: 11.05.01